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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/676,556	09/30/2000	Yen-Kuang Chen	042390.P8657	6918

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EXAMINER

DO, CHAT C

ART UNIT PAPER NUMBER

2193

DATE MAILED: 08/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/676,556

Applicant(s)

CHEN ET AL.

Examiner

Chat C. Do

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 June 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is responsive to Amendment filed 06/13/2006.
2. Claims 29-46 are pending in this application. Claims 29, 34, and 39 are independent claims. In Amendment, claims 1-28 are cancelled. This Office Action is made final.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 29-46 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 29-46 clearly recite a method, readable medium, and system for multiplying matrices according to a mathematic algorithm. In order for such a claim to be statutory, the claim must include either a practical application at useful end or a discrete, useful, and tangible result(s). However, it is clear from the claims that the claims merely recite step or non-specific means for data computation and manipulation in performing a mathematical function. In addition, the readable medium claims 34-38 and 45 are not tangible such as electrical, optical, acoustical or other form of propagated signals (e.g., carrier waves, infrared signals, digital signals, etc.) as cited in the specification page 6. The input is a set of number and output is also a set of number. Even though it receives a multimedia signal, but it does not include any practical

application at useful or a tangible result. Therefore, claims 29-46 are clearly directed to a non-statutory subject matter.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 29-32, 34-37, and 39-42 are rejected under 35 U.S.C. 103(a) as being obvious over Thuyen Le et al. ("A new flexible architecture for variable length DC targeting shape-adaptive transform") in view of Mogi et al. (U.S. 6,687,724).

Re claim 29, Thuyen Le et al. disclose a machine-implemented method (e.g. abstract) comprising: receiving a multimedia signal having data values (e.g. page 1949 first paragraph under the introduction section); forming the data values into a matrix of inputs [X] (e.g. $x(n)$); forming a matrix [A] of predetermined values (e.g. left column page 1950 lines 12-22) and multiplication operations (e.g. equation 2 in left column page 1950); factoring [A] into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M] (e.g. as C(n), F of equation 3, S of equation 7, and P of equation 4 respectively), wherein the multiplication operations are selectively positioned into paris within [M] (e.g. Figure 1 and left column page 1951 lines 3-7 wherein plurality of multiplications are performed by plurality of CFMB modules and the plurality of CFMB modules are parallel; CFMB-0 & CFMB-1; CFMB-2 & CFMB-3); and executing by a

processor instruction (e.g. $P_{(x,y),7}$). Thuyen Le et al. do not disclose simultaneously executing multiplication operations on the grouped set of values using a Single Instruction Multiple Data (SIMD) instruction. However, Mogi et al. disclose in column 1 that the SIMD instruction is widely used to execute multiplication operations on a group set of values (e.g. col. 1 lines 40-55). Therefore it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the SIMD instruction to simultaneously executing multiplication operations on the grouped set of values as seen in Mogi et al.'s invention into Thuyen Le et al.'s invention because it would enable to increase the system performance by executing multiple data simultaneously and efficiently in matrix multiplication (e.g. col. 1 lines 40-55).

Re claim 30, Thuyen Le et al. do not disclose the SIMD is the Packed Multiply and Add (PMADDWD) instructions. However, Mogi et al. disclose in Figure 2 the SIMD is the PMADDWD instruction (col. 2 lines 5-16). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the PMADDWD instructions as seen in Mogi et al.'s invention into Thuyen Le et al.'s invention because it would enable to increase the system performance by executing multiple data simultaneously (e.g. col. 1 lines 40-55).

Re claim 31, Thuyen Le et al. further disclose values within [B] and [S] are integers selected from the group consisting of 1, 0 and -1 (e.g. F and S matrices in page 1950).

Re claim 32, Thuyen Le et al. further disclose [A] is a 4-point Discrete Cosine Transform (DCT) transformation matrix (e.g. abstract), [X] represents a time domain of a

video signal, and [Y] represents a frequency domain of the video signal (e.g. first paragraph under introduction section in page 1949).

Re claim 34, it is a machine-readable medium having instructions claim of claim 29. Thus, claim 34 is also rejected under the same rationale as cited in the rejection of rejected claim 29.

Re claim 35, it is a machine-readable medium having instructions claim of claim 30. Thus, claim 35 is also rejected under the same rationale as cited in the rejection of rejected claim 30.

Re claim 36, it is a machine-readable medium having instructions claim of claim 31. Thus, claim 36 is also rejected under the same rationale as cited in the rejection of rejected claim 31.

Re claim 37, it is a machine-readable medium having instructions claim of claim 32. Thus, claim 37 is also rejected under the same rationale as cited in the rejection of rejected claim 32.

Re claim 39, it is a system claim of claim 29. Thus, claim 39 is also rejected under the same rationale as cited in the rejection of rejected claim 29.

Re claim 40, it is a system claim of claim 30. Thus, claim 40 is also rejected under the same rationale as cited in the rejection of rejected claim 30.

Re claim 41, it is a system claim of claim 31. Thus, claim 41 is also rejected under the same rationale as cited in the rejection of rejected claim 31.

Re claim 42, it is a system claim of claim 32. Thus, claim 42 is also rejected under the same rationale as cited in the rejection of rejected claim 32.

Response to Arguments

7. Applicant's arguments filed 06/13/2006 have been fully considered but they are not persuasive.

- a. The applicant argues in pages 7-8 for claims 29-46 that several practical applications of the processes are provided in the specification and the claims do not need to limit the process to a particular practical application.

The examiner respectfully submits that the interim guideline requires the claims must include a practical application to produce a concrete, useful, and tangible result regardless of hardware implementation. However from the claims, they do not limit any practical application, which is concrete, useful, and tangible result. Generally, the claims disclose a mathematical method, system, and medium of performing a multiplication of matrices A and X to obtain Y.

- b. The applicant argues in pages 9-10 that the butterfly structure is so well known in the art as a square matrix with symmetric property as seen in page 9. There, it does not need to recite in the claim. Further, the butterfly matrices are square matrices, but matrix [F] is not a square matrix.

The examiner respectfully submits that the applicant admitted the γ element of matrix F is arbitrary assigned (e.g. left column in page 1950). Therefore, matrix F can be a butterfly matrix by correctly selecting $\gamma(x)$. Further, the matrix [F] has the size of 10x4 as an example. It can be a square matrix because the factor

matrix $C_{N \times N}$ is a square matrix. Generally, the claims broadly interpret as having large matrix [A] factor into three sub-matrices [B], [S], and [M] and further perform multiplications on these three sub-matrices with matrix [X] to obtain matrix [Y]. The claims do not specific the structure, type, nor the size of each individual matrix. The methods for factoring matrix into matrices are well known in the art.

- c. The applicant argues in page 10 that the secondary reference does not disclose the factoring a matrix into a butterfly B, shuffle S, and multiplication M as seen in the claimed invention.

The examiner respectfully submits that the secondary reference is used to disclose the missing feature in the primary reference, which uses SIMD instruction to perform multiplication. The secondary reference does not need to disclose every single limitation cited in the claim.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (571) 272-3719. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2193

August 4, 2006


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